



(12) **United States Patent**
Alvarez Ruiz et al.

(10) **Patent No.:** **US 9,636,979 B1**
(45) **Date of Patent:** **May 2, 2017**

(54) **VEHICLE FRAME STRUCTURE**

(56) **References Cited**

(71) Applicant: **FORD GLOBAL TECHNOLOGIES, LLC**, Dearborn, MI (US)

U.S. PATENT DOCUMENTS

(72) Inventors: **Ezequiel Alvarez Ruiz**, Mexico City (MX); **Cynthia Wetzel**, Dearborn, MI (US); **Siavash Osooli**, Commerce, MI (US)

7,503,619 B2	3/2009	Werner	
8,746,777 B2 *	6/2014	Iwano	B60J 5/101 296/146.11
8,899,658 B1	12/2014	Gangal et al.	
2014/0203591 A1 *	7/2014	Lathwesen	B60J 5/107 296/146.8

(73) Assignee: **Ford Global Technologies, LLC**, Dearborn, MI (US)

FOREIGN PATENT DOCUMENTS

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 1 day.

DE	102008031124 A1	1/2010	
DE	102012008561 B4	5/2014	
EP	3002144 A1 *	4/2016	B60J 5/107

* cited by examiner

(21) Appl. No.: **14/971,369**

Primary Examiner — Pinel Romain

(22) Filed: **Dec. 16, 2015**

(74) *Attorney, Agent, or Firm* — Jason C. Rogers; Brooks Kushman P.C.

(51) **Int. Cl.**
B62D 65/06 (2006.01)
B60J 5/10 (2006.01)

(57) **ABSTRACT**

(52) **U.S. Cl.**
CPC **B60J 5/107** (2013.01); **B62D 65/06** (2013.01)

A vehicle includes a cross-member and a hinge. The cross-member has a horizontal surface converging with a vertical surface. The vertical surface has a generally flat profile and defines at least one curved recess proximate to a hinge support area located on the horizontal surface. The cross-member has a yield strength that is greater proximate to the curved recess relative to the remaining generally flat profile. The hinge is secured to the hinge support area.

(58) **Field of Classification Search**
CPC B60J 5/107; B62D 65/06
USPC 296/146.6
See application file for complete search history.

20 Claims, 3 Drawing Sheets

